



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/498,375	02/04/2000	Kazunori Ito	0557-4909-3	8731

22850 7590 07/31/2002

OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC  
FOURTH FLOOR  
1755 JEFFERSON DAVIS HIGHWAY  
ARLINGTON, VA 22202

EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT PAPER NUMBER

1753

7

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/498,375

Applicant(s)

Ito et al.

Examiner

Rodney McDonald

Art Unit

1753



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Oct 4, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above, claim(s) 43-72 and 74-80 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32, 40-42, and 73 is/are rejected.
- 7) ☒ Claim(s) 33-39 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☒ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☐ Other:

Art Unit: 1753

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The Information Disclosure Statement is missing from the file. It is requested that the Applicant provide a copy for consideration in the next action.

### ***Election/Restriction***

2. Applicant's election with traverse of Group I, Claims 1-42 and 73 in Paper No. 6 is acknowledged. The traversal is on the ground(s) that the searches would be overlapping. This is not found persuasive because the inventions are unrelated as set forth in the requirement for restriction of Paper 5.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 112***

3. Claims 16, 20, 23-29, 32 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 is indefinite because "excellent" lacks basis for comparison.

Claim 20 is indefinite because "excellent" lacks basis for comparison.

Claim 23, line 17, is indefinite because "wherein and said" is indefinite.

Claim 23, line 19, is indefinite because "the outer edge of said inner mask" lacks antecedent basis.

Claim 23, line 20, is indefinite because "the inner side of the inner edge of said outer mask" lacks antecedent basis.

Art Unit: 1753

Claim 25, lines 2 and 3, is indefinite because "the edge of said substrate holding section" lacks antecedent basis.

Claim 27, line 2, is indefinite because "the edge of said substrate holding section" lacks antecedent basis.

Claim 29, line 2, is indefinite because "said low hardness material" lacks antecedent basis.

Claim 29, line 2, is indefinite because "low" lacks antecedent basis for comparison.

Claim 32, line 6, is indefinite because "(described as load lock chamber)" lacks antecedent basis.

Claim 40, line 7, is indefinite because "R" lacks antecedent basis.

Regarding claim 42, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP. § 2173.05(d).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Itano (Japan 1-298162).

Itano teaches a sputter jig for optical disk, the inside peripheral part of an optical disk 2 is fixed to a substrate holder 1 by means of an inside-peripheral supporting medium 3 and a screw 5. The positioning accuracy of the substrate holder 1 and the inside-peripheral supporting medium is

Art Unit: 1753

determined by the fit between both. The outside peripheral part of the optical disk substrate 2 is fixed to the substrate holder 1 by means of an outside-peripheral supporting medium 4 and a screw 6. The positioning accuracy of the substrate holder 1 and the outside-peripheral supporting medium 4 is determined by the fit between pins 7 stuck in the substrate holder 1 and the outside-peripheral supporting medium 4. By using this jig the range of film formation can be controlled with high precision. (See Abstract)

Figures 1-3 shows a rear surface of the substrate holder contacting at least a portion of the rear surface of the film-formed are of the substrate. (See Figures 1-3)

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1753

7. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 1-298162) in view of Hiyamizu et al. (U.S. Pat. 4,906,011).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The differences between Itano and the present claims is that the contact holding surface being made from a material with hardness lower than the substrate.

Hiyamizu et al. teach a vacuum chuck, which is an accessory device for holding a workpiece which has a suction head made of porous sintered particles of a thermoplastic resin, e.g., a fluorocarbon resin, preferably bonded to the chuck base. The suction head is free from the problem of unreliableness of holding of workpieces without the danger of damaging the workpiece. (See Abstract)

Chucks holds workpieces having a relatively small thickness and made of a non-magnetic recording media, glass plate for photomasks, single crystal wafers of, for example, semiconductor silicon and the like. (Column 1 lines 13-21)

FIG. 1 illustrates a conventional vacuum chuck as partly cut by a perspective view. In FIG 1, an annular suction head 8 made of a rigid and non-porous plastic resin is provided with grooved channels 9 running concentrically and mounted on and adhesively bonded to the metal-made chuck base 1 of the vacuum chuck. The grooved channels 9 are communicated to the perforations 2 in the chuck base 1 to form vacuum ducts so that the workpiece 7 mounted on the suction head 8 is strongly pressed against the suction head 8 when the vacuum ducts of the vacuum chuck are connected to a vacuum line (not shown in the figure). (Column 2 lines 19-30)

Art Unit: 1753

FIG. 2, on the other hand, illustrates a vacuum chuck of the invention as partly cut by a perspective view. As is shown in this figure, the annular suction head 4 is made of a porous body which is prepared by sintering fine particles of a thermoplastic resin and the inner and outer peripheral surfaces thereof are provided with air-impermeable layers 5,5. The suction head 4 is mounted on and adhesively bonded to the upper surface 6 of a metal-made chuck base 1.

(Column 2 lines 31-39)

The suction head 4 made of a porous sintered plastic powder can be prepared according to a known procedure in which a powder of a thermoplastic resin is shaped by molding in a metal mold without heating and then the power compact is heated at an appropriate temperature to effect sintering of the plastic particles. It is important in the invention that the process of sintering is performed under such conditions that open pores are formed to serve as the vacuum ducts.

(Column 2 lines 40-48)

Examples of suitable thermoplastic resins include, for example, fluorocarbon resins, polyamide resins, polyethylenes, polystyrenes, polyvinyl chloride resins, polyvinyl alcohols, polycarbonate resins, acrylic resins and the like which can be selected and used without particular limitations depending on the hardness of the workpieces, strength of suction by vacuum, method of machining and so on. These plastic resins can be used either singly or as a blend of two kinds or more according to need. (Column 2 lines 49-58)

The vacuum chuck of the invention can be used in machining of workpieces made of a variety of materials having a hardness equal to or higher than the hardness of the thermoplastic

Art Unit: 1753

resin forming the suction head including plastics, metals having a relatively low hardness such as aluminum, copper and the like, iron or steel, glass, single crystal wafers of semiconductors such as silicon and gallium arsenide, ceramic materials such as silicon carbide, alumina and the like, and so on. The workpiece should desirably have a large surface area available for suction and a small thickness but use of an appropriate adapter may facilitate working with a workpiece not so wide in surface area and not so small in thickness by expanding the effective surface area available for suction. (Column 4 lines 14-22)

The motivation for utilizing a contact surface that has a hardness lower than the substrate is that it allows for providing a contact surface that leads to flatness of the substrate. (Column 1 lines 53-62)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a contact surface that has a hardness lower than the substrate as taught by Hiyamizu et al. because it allows for providing a contact surface that leads to flatness of the substrate.

8. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Aoyama et al. (U.S. Pat. 5,324,012).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The difference between Itano and the present claims is that the substrate holder has a vacuum chuck section for absorbing and fixing said contact holding surface to the substrate with a groove section.



Art Unit: 1753

Aoyama et al. teach in Figs. 1 and 2 the construction of a wafer holder according to a first embodiment of the present invention. In the Figures, the wafer vacuum holding surface of a wafer holder WH is formed into a circular shape of a diameter which is slightly smaller than the diameter of a wafer W, and the wafer holding surface is formed with a plurality of annular projections 1 (wafer supporting portions) and annular grooves (vacuum holding grooves) which are concentrically (or helically) arranged radially from the center of the wafer holder WH at a constant pitch in the like manner as rims. (Column 5 lines 43-54)

The annular grooves 2 are respectively formed with channels comprising vacuum holes or suction holes 3 which are arranged radially and the vacuum holes 3 are communicated with a manifold or sleeve-like hole 4 extended radially within the wafer holder WH. The hole 4 is connected to a vacuum source for pressure reducing purposes so that a negative pressure is produced within the space enclosed by the back of the wafer W and the annular grooves 2 and the resulting holding action causes the back of the wafer W to be corrected in conformity with the tops of the plurality of annular projections 1, thereby making the wafer flat. (Column 6 lines 1-12)

The motivation for having a substrate holder with a vacuum chuck section for absorbing and fixing said contact holding surface to the substrate with a groove section is that it allows for holding the wafer flat. (Column 6 line 12)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a vacuum chuck section for absorbing and

Art Unit: 1753

fixing said contact holding surface to the substrate with a groove section as taught by Aoyama et al. because it allows for holding the wafer flat.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Aoyama et al. as applied to claims 1 and 3 above, and further in view of Tamura et al. (U.S. Pat. 6,336,991).

The difference not yet discussed is the use of a removal claw.

Tamura et al. teach a pusher 19 for inserting and removing the substrate from a substrate holder. (Column 14 lines 46-50)

The motivation for utilizing a pusher is that it allows for movement of the substrate. (Column 14 lines 46-50)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a removal claw as taught by Tamura et al. because it allows for movement of the substrate.

10. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Tateishi et al. (U.S. Pat. 4,675,096).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The differences between Itano and the present claims is that the apparatus having a carriage chamber and film formation chamber with controllable pressures is not discussed.

A continuous sputtering apparatus comprising a main vacuum chamber, one loading station and a plurality of process stations capable of having their pressures controlled separately.

Art Unit: 1753

The process station includes a sub vacuum chamber capable of being in communication with the main vacuum chamber through an opening and an evacuation port. The loading station and the process stations are arranged to be spaced with equal angles. Substrate holders are provided to face the stations and are rotated by said equal angle in a time. The substrate holder opens and closes the opening of the sub vacuum chamber to serve as a gate valve. (See Abstract)

The motivation for utilizing a substrate holder in an apparatus with a carriage chamber and film formation chamber with controllable pressures is that it allows for a continuous apparatus that is capable of controlling pressures in the chambers. (Column 1 lines 38-48)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a carriage chamber and film formation chamber with controllable pressures as taught by Tateishi et al. because it allows for a continuous apparatus that is capable of controlling pressures in the chambers.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Ueda et al. (U.S. Pat. 6,391,418).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The difference between Itano and the present claims is that thickness of the substrate.

Ueda et al. teach that an optical disc substrate can be 0.3 to 1.5 mm in thickness. (Column 11 lines 35-40)

The motivation for selecting a substrate thickness in this range is that it allows for a substrate that is transparent or opaque. (Column 11 line 26)

Art Unit: 1753

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a substrate of 0.6 mm in thickness as taught by Ueda et al. because it allows for utilizing a substrate that is transparent or opaque.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Ueda et al. as applied to claim 6 above, and further in view of Hiyamizu et al. (U.S. Pat. 4,906,011).

The differences not yet discussed is the contact holding surface being made from a material with a hardness that is lower than the substrate.

Hiyamizu et al. is discussed above and all is as applies above. (See Hiyamizu et al. discussed above)

The motivation for utilizing a contact holding surface being made from a material with a hardness that is lower than the substrate is that it allows for providing a contact surface that leads to flatness of the substrate. (See Hiyamizu et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a contact holding surface being made from a material with a hardness that is lower than the substrate as taught by Hiyamizu et al. because it allows for providing a contact surface that leads to flatness of the substrate.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Ueda et al. as applied to claim 6 above, and further in view of Aoyama et al. (U.S. Pat. 5,324,012).

Art Unit: 1753

The difference not yet discussed is that the substrate holder has a vacuum chuck section for absorbing and fixing said contact holding surface to the substrate with a groove section.

Aoyama et al. is discussed above and all is as applies above. (See Aoyama et al. discussed above)

The motivation for having a substrate holder with a vacuum chuck section for absorbing and fixing said contact holding surface to the substrate with a groove section is that it allows for holding the wafer flat. (See Aoyama et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a substrate holder with a vacuum chuck section for absorbing and fixing said contact holding surface to the substrate with a groove section as taught by Aoyama et al. because it allows for holding the wafer flat.

14. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Ueda et al. and Aoyama et al. as applied to claims 6 and 8 above, and further in view of Tamura et al. (U.S. Pat. 6,336,991).

The differences not yet discussed is the use of a removal claw.

Tamura et al. is discussed above and all is as applies above. (See Tamura et al. discussed above)

The motivation for utilizing a removal claw is that it allows for movement of the substrate. (See Tamura et al. discussed above)

Art Unit: 1753

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a removal claw as taught by Tamura et al. because it allows for movement of the substrate.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Ueda et al. as applied to claim 6 above, and further in view of Tateishi et al. (U.S. Pat. 4,675,096).

The differences not yet discussed is the use of an apparatus having a carriage chamber and film formation chamber with controllable pressures is not discussed.

Tateishi is discussed above and all is as applies above. (See Tateishi et al. discussed above)

The motivation for utilizing a substrate holder in an apparatus with a carriage chamber and film formation chamber with controllable pressures is that it allows for a continuous apparatus that is capable of controlling pressures in the chambers. (Column 1 lines 38-48)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a carriage chamber and film formation chamber with controllable pressures as taught by Tateishi et al. because it allows for a continuous apparatus that is capable of controlling pressures in the chambers.

16. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Kataoka et al. (Japan 55-143036).

Itano is discussed above and all is as applies above. (See Itano discussed above)

Art Unit: 1753

The differences between Itano and the present claims is that a roughness is not discussed and a specific range of roughness is not discussed.

Kataoka et al. teach a holding part 11 for holding a wafer 20 shaped as a recess. A suction hole 13, which is connected to a vacuum pump, a plurality of annular grooves 14 surrounding the suction hole 13 and a plurality of radial grooves 15 are provided in the bottom of the holding part 11 so that the suction hole, the annular grooves and the radial grooves are connected to one another. An annular fitting groove 16 is provided on the top of the wall of the holding part 11 and filled with a sealing polyester resin material 17. A gas-permeable metal disc 18, whose surface 18 is made rough and which is made of a porous sintered metal or the like, is fitted in the recess of the holding part 11. A wafer 20 to be sucked is placed on the metal disc 18 and the sealing material 17. As a result, dusts are sucked into the recesses of the rough surface 18a so that the dusts are prevented from adhering to the wafer 20. (See Abstract)

The roughness can be 0-40 microns. (Column 5)

The motivation for utilizing a rough surface is so that adhering dusts enter the recesses. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a rough contact surface as taught by Kataoka et al. because it allows for adhering dust to enter into the rough surfaces.

Application/Control Number: 09/498,375

Art Unit: 1753

17. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Kataoka et al. as applied to claims 11 and 12 above, and further in view of Hiyamizu et al. (U.S. Pat. 4,906,011).

The differences not yet discussed is a lubrication or self-lubricating plastic material is utilized like a fluororesin.

Hiyamizu et al. is discussed above and teach utilizing a fluorocarbon resin as a contact layer which is lubricating due to the nature of the resin material. (See Hiyamizu et al. discussed above)

The motivation for utilizing a fluorocarbon resin is that it allows for providing a contact surface that leads to flatness of the substrate. (See Hiyamizu et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a lubrication or self-lubricating plastic material such as a fluororesin as taught by Hiyamizu et al. because it allows for providing a contact surface that leads to flatness of the substrate.

18. Claims 15-21 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Hiyamizu et al. (U.S. Pat. 4,906,011) and Toyama (U.S. Pat. 6,387,809).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The differences between Itano and the present claims is that a porous member for in a groove section is not discussed.



Application/Control Number: 09/498,375

Art Unit: 1753

Hiyamizu et al. is discussed above and all is as applies above. (See Hiyamizu et al. discussed above)

The motivation utilizing a porous member to hold the substrate is that it allows the substrate to be flat. (See Hiyamizu et al. discussed above)

Toyama teach inserting a porous chuck plate into a receiving recess. (Column 3 lines 45-50)

The motivation for inserting a porous plate into a recess is that it allows chucking of the substrate. (Column 3 lines 45-50)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a porous member as taught by Hiyamizu et al. and to have utilized the porous member in the groove as taught by Toyama because it allows for holding the substrate flat and for chucking the substrate.

19. Claims 30, 31 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano (Japan 01-298162) in view of Wada (U.S. Pat. 5,267,607).

Itano is discussed above and all is as applies above. (See Itano discussed above)

The difference between Itano and the present claims is that a gas supply section for introduction of gas in the substrate holder side in a limited portion between a substrate setting surface of the substrate holder and a film-formed substrate, and at least a closed space section in the area formed in the substrate holder side because of contact between the substrate and the substrate holder is not discussed.

Art Unit: 1753

Wada teach a magnetron sputtering apparatus having a heating susceptor in a vacuum chamber to support a wafer. The wafer is fixed on a ring-shaped projection by clamps at wafer-mounted section on the top of the susceptor. A substantially closed space is formed between the underside of the wafer and that face on the top of the susceptor which is defined by the wafer-mounted section to oppose the underside of the wafer. Ar gas which serves as heat-medium gas is supplied into the closed space, flowing into it from its peripheral area. The Ar gas is exhausted at the center of the closed space by a vacuum pump. Heat is transmitted from the susceptor of the wafer through the Ar gas to set the wafer at a certain temperature. (See Abstract)

FIG. 3 is a sectional view schematically showing how the wafer heating system of the susceptor 3 is arranged. (Column 7 lines 53-55)

The susceptor 3 has a support 31 on which the wafer 1 is mounted. Contacting the underside of the wafer 1 along the rim thereof, a ring-shaped gas sealing projection 32 is projected from that top of the support 31, on which the wafer 1 is mounted, so as to seal a clearance formed between the top of the support 31 and the wafer 1. The height of this gas sealing ring-shaped projection 32 may be made higher than that of the highest of convexes on the uneven underside of the wafer 1 and it has been made 0.16 mm in this case. The semiconductor wafer 1 is mounted on the gas sealing ring shaped projection 32 and fixed there by pressing force added by clamps 33. (Column 7 lines 56-68)

Art Unit: 1753

A gas pipe 36 is provided in the support 31 to introduce a heat-medium gas into the clearance between the top of the support 31 and the wafer 1. A gas exhaust pipe 35 is also provided in the support 31 to exhaust the heat-medium gas introduced into the clearance.

(Column 8 lines 1-5)

The gas pipe 36 communicates with gas passage 40 arranged along the inner top corner of the support 31. The heat-medium gas introduced into the ring-shaped gas passage 40 through the gas pipe 36 is then introduced into the clearance 37 through a plurality of gas inlets 41 formed in the top of the support 31, extending and along the rim of the wafer 1, and communicating with the ring-shaped gas passage 40. In order to keep the wafer 1 uniform in temperature, it is preferable that the number of the gas inlets 41 formed at a certain interval is plural or 16, for example, as shown in FIG. 4. The gas pipe 36 is connected to a heat-medium gas source or Ar gas source 43, for example, through mass flow controller (MFC) 42. (Column 8 lines 6-19)

That end of the gas exhaust pipe 35 which faces the clearance 37 is made open to collect the heat-medium gas in the clearance 37 at a position which corresponds to the center of the wafer 1. The other end of the gas exhaust pipe 35 is connected to a vacuum pump 45, variable in exhaust conductance, by which the heat-medium gas in the clearance 37 is exhausted through the gas exhaust pipe 35. A flow rate adjusting valve 46 is attached to the gas exhaust pipe 35, and is adjusted by a pressure controller (PRC) 47 which detects pressure on the side of the clearance 37. (Column 8 lines 20-31)

Art Unit: 1753

Gas pressure in the clearance 37 between the top of the support 31 and the semiconductor wafer 1 may be set higher than such a pressure that enables desired heat exhausting characteristics to be guaranteed but lower than such a pressure that can keep the wafer 1, which is fixedly pressed by the clamps 33, not deformed. The gas pressure in this case has been set about 1-5 Torr, which is close to the lower limit of the above-mentioned gas pressure range. When the gas pressure is selected to be in the arrange of 1-5 Torr, a rotary pump can be used as the vacuum pump and it can also be used to reduce pressure in the chamber. (Column 8 lines 32-43)

The motivation for providing a space between the wafer and substrate holder for holding gas is that it allows for transmitting heat to the substrate. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Itano by utilizing a space between the substrate and holder as taught by Wada because it allows for the transfer of heat.

20. Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itano in view of Wada as applied to claims 30, 31 and 40 above, and further in view of Hiyamizu et al. (U.S. Pat. 4,906,011).

The differences not yet discussed is a lubrication or self-lubricating plastic material is utilized like a fluororesin.

Hiyamizu et al. is discussed above and teach utilizing a fluorocarbon resin as a contact layer which is lubricating due to the nature of the resin material. (See Hiyamizu et al. discussed above)

Art Unit: 1753

The motivation for utilizing a fluorocarbon resin is that it allows for providing a contact surface that leads to flatness of the substrate. (See Hiyamizu et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a lubrication or self-lubricating plastic material such as a fluoro-resin as taught by Hiyamizu et al. because it allows for providing a contact surface that leads to flatness of the substrate.

***Allowable Subject Matter***

21. Claims 23-29 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

22. Claim 32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. Claims 33-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. The following is a statement of reasons for the indication of allowable subject matter:

Claims 23-29 are indicated as being allowable over the prior art of record because the prior art of record does not teach the optical disk film-formation apparatus as claimed wherein the substrate holding section contacts said optical disk substrate in the portion extending between a

Art Unit: 1753

line which is 2 to 10 mm on the outer side of the outer edge of said inner mask and a line which is 0.5 to 5 mm on the inner side of the inner edge of said outer mask.

Claim 32 is indicated as being allowable over the prior art because the prior art of record does not teach the gas supply for between the substrate and holder used as a vent gas as claimed.

Claims 33, 34, 36 and 38 are indicated as being allowable over the prior art of record because the prior art of record does not teach the optical disk substrate film formation apparatus as claimed wherein a gas inlet port for introducing gas from outside of the optical disk substrate film-formation apparatus is provided in an internal wall of a frame of the optical disk substrate film-formation apparatus forming a closed space of the load lock chamber, a gas supply port communicating to gas supply section is provided in said substrate holder, and said gas inlet port of the frame of the optical disk substrate film-formation apparatus and said gas supply port of said substrate holder are communicated to each other only when said substrate holder moves to a specified position of the load lock chamber.

Claims 35, 37 and 39 are indicated as being allowable over the prior art of record because the prior art of record does not teach the optical disk substrate film-formation apparatus as claimed having a tapered structure on which a joint section of said gas inlet port of the frame of said optical disk substrate film-formation apparatus and that of said gas supply port of said substrate holder are positioned one above another.

Art Unit: 1753

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney McDonald whose telephone number is 703-308-3807. The examiner can normally be reached on M-Th from 8 to 5:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen, can be reached on (703) 308-3322. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



**RODNEY G. McDONALD**  
**PRIMARY EXAMINER**

RM

July 25, 2002